

wherein said INPROL is selected from the group consisting of the alpha chain of hemoglobin, the beta chain of hemoglobin, the gamma chain of hemoglobin, the delta chain of hemoglobin, the epsilon chain of hemoglobin, the zeta chain of hemoglobin,

a polypeptide having the sequence of amino acids 1-97 of the human alpha hemoglobin chain,

a polypeptide having the sequence of amino acids 1-94 of the human alpha hemoglobin chain,

Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val, (SEQ ID NO: 1)

Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys (SEQ ID NO: 2)

(where the two Cys residues form a disulfide bond),

Asp-Ala-Leu-Thr-asn-Ala-Val-Ala-His-Val-Asp-Asp-Met-Pro-Asn-ala-Leu-Ser-Ala (SEQ ID NO: 3),

Phe-Leu-Gly-Phe-Pro-Thr (SEQ ID NO: 34),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 4),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 5),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 6),

Leu-Val-Val-Tyr-Pro-Trp-Thr (SEQ ID NO: 7),

Leu-Val-Val-Tyr-Pro-Trp (SEQ ID NO: 8),

Leu-Val-Val-Tyr-Pro (SEQ ID NO: 9),

Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 10),

Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 12),

Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 13) and

Tyr-Pro-Trp-Thr (SEQ ID NO: 28).

wherein said stem cells are cells which can generate at least one of multiple lineages and other stem cells.

48. (Amended) A method as in claim 47 wherein said INPROL is selected from the group consisting of the alpha chain of hemoglobin, the beta chain of hemoglobin, the gamma chain of hemoglobin, the delta chain of hemoglobin, the epsilon chain of hemoglobin, the zeta chain of hemoglobin,

a polypeptide having the sequence of amino acids 1-97 of the human alpha hemoglobin chain,

a polypeptide having the sequence of amino acids 1-94 of the human alpha hemoglobin chain.

49. (Twice Amended) A method as in claim 47 wherein said INPROL is selected from the group consisting of peptides having the sequence:

Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val, (SEQ ID NO: 1)

Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys (SEQ ID NO: 2)

(where the two Cys residues form a disulfide bond),

Asp-Ala-Leu-Thr-[asn]Asn-Ala-Val-Ala-His-Val-Asp-Asp-Met-Pro-Asn-ala-Leu-Ser-Ala (SEQ ID NO: 3).

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 4).

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 5).

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 6),

Leu-Val-Val-Tyr-Pro-Trp-Thr (SEQ ID NO: 7),

Leu-Val-Val-Tyr-Pro-Trp (SEQ ID NO: 8),

Leu-Val-Val-Tyr-Pro (SEQ ID NO: 9),

Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 10),

Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 11),

Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 12),

Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 13), and

Tyr-Pro-Trp-Thr (SEQ ID NO: 28).

50. (Amended) A method as in claim 47 wherein said opiate compound is selected from the group consisting of morphine, etorphine, codeine, heroin, hydromorphone, oxymorphone, levorphanol, levallorphan, codeine, hydrocodone, oxycodone, nalorphine, naloxone, buprenorphine, butanorphanol, nalbuphine, meperidine, alphaprodine, diphenoxylate, fentanyl, (D-Ala², N-Me-Phe⁴, glycinol⁵)-Enkephalin [DAMGO], [DALDA] (D-Arg², Lys⁴)-Dermorphin (1-4) amide and nociceptin.

Add the following claims.

91. The method of claim 49, comprising contacting hematopoietic cells with a stem cell

(SEQ ID NO: 1).

92. The method of claim 49, comprising contacting hematopoietic cells with a stem cell proliferation stimulating amount of Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys- (SEQ ID NO: 2) wherein the two Cys residues form a disulfide bond.

93. The method of claim 47, comprising contacting hematopoietic stem cells with a stem cell proliferation stimulating amount of Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val (SEQ ID NO: 1).

94. The method of claim 47, comprising contacting stem cells with a stem cell proliferation stimulating amount of Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys (SEQ ID NO: 2) wherein the two Cys residues form a disulfide bond.

95. A method of stimulating stem cell proliferation comprising contacting stem cells with a stem cell proliferation stimulating amount of INPROL or an opiate compound or a stem cell proliferation stimulating amount of a combination of INPROL and an opiate compound,

wherein said INPROL is selected from the group consisting of the alpha chain of hemoglobin, the beta chain of hemoglobin, the gamma chain of hemoglobin, the delta chain of hemoglobin, the epsilon chain of hemoglobin, the zeta chain of hemoglobin,

a polypeptide having the sequence of amino acids 1-97 of the human alpha hemoglobin chain,

chain,

Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val. (SEQ ID NO: 1)

Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys (SEQ ID NO: 2)

(where the two Cys residues form a disulfide bond),

Asp-Ala-Leu-Thr-asn-Ala-Val-Ala-His-Val-Asp-Asp-Met-Pro-Asn-ala-Leu-Ser-Ala (SEQ ID NO: 3),

Phe-Leu-Gly-Phe-Pro-Thr (SEQ ID NO: 34),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 4).

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 5),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 6),

Leu-Val-Val-Tyr-Pro-Trp-Thr (SEQ ID NO: 7),

Leu-Val-Val-Tyr-Pro-Trp (SEQ ID NO: 8),

Leu-Val-Val-Tyr-Pro (SEQ ID NO: 9),

Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 10),

Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 11),

Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 12),

Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 13), and

Tyr-Pro-Trp-Thr (SEQ ID NO: 28),

wherein said stem cells are cells which can generate at least one of multiple lineages and other stem cells.

96 A method as in claim 95 wherein said INPROL is selected from the group consisting

hemoglobin, the delta chain of hemoglobin, the epsilon chain of hemoglobin, the zeta chain of hemoglobin

a polypeptide having the sequence of amino acids 1-97 of the human alpha hemoglobin chain, and

a polypeptide having the sequence of amino acids 1-94 of the human alpha hemoglobin chain.

97. A method as in claim 95 wherein said INPROL is selected from the group consisting of peptides having the sequence:

Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val, (SEQ ID NO: 1)

Cys-Phe-Pro-His-Phe-Asp-Leu-Ser-His-Gly-Ser-Ala-Gln-Val-Cys (SEQ ID NO: 2)

(where the two Cys residues form a disulfide bond),

Asp-Ala-Leu-Thr-Asn-Ala-Val-Ala-His-Val-Asp-Asp-Met-Pro-Asn-ala-Leu-Ser-Ala (SEQ ID NO: 3),

Phe-Leu-Gly-Phe-Pro-Thr (SEQ ID NO: 34),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg-Phe (SEQ ID NO: 4),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 5),

Leu-Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 6),

Leu-Val-Val-Tyr-Pro-Trp-Thr (SEQ ID NO: 7),

Leu-Val-Val-Tyr-Pro-Trp (SEQ ID NO: 8),

Leu-Val-Val-Tyr-Pro (SEQ ID NO: 9),

Val-Val-Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 10),

Tyr-Pro-Trp-Thr-Gln-Arg (SEQ ID NO: 11),

Tyr-Pro-Trp-Thr-Gln (SEQ ID NO: 13), and